



Hersteller/Manufacturer: German Special Alloys GmbH | Carl-Friedrich-Benz-Str. 1b | 47877 Willich | Germany

C € 0044

Hergestellt für/ Produced for:

Realloy e.K. | Moerserstraße 232 | 47803 Krefeld | Germany | Fon: : +49 (0)2151-4864978 | Fax: +49 (0)2151-4864981 | Mail: info@realloy.net

Instructions for Use metal-ceramic alloy

Realloy BC Softblank

Realloy BC Softblank is a dental metal-ceramic alloy based on cobalt. **Realloy BC Softblank** is free from nickel, cadmium, beryllium and lead and fulfils the standards of EN ISO 22674 type 4 for appliances with thin sections that are subject to very high forces, e.g. removable partial dentures, clasps, thin veneered crowns, wide-span bridges or bridges with small cross sections, bars, attachments and implant retained superstructures.

Composition wt

Co	%	61,7
Cr	%	27,8
W	%	8,5
Si	%	1,6
Nb, Fe, Mn, N	%	< 1

Properties

Density ρ	$\text{g} \cdot \text{cm}^{-3}$	8,4
Vickers hardness	HV 10	290
Linear thermal expansion coefficient α 25 – 500 °C	$10^{-6} \cdot \text{K}^{-1}$	14,1
Linear thermal expansion coefficient α 20 – 600 °C	$10^{-6} \cdot \text{K}^{-1}$	14,4
Melting range $T_S - T_L$	°C	1310-1400
Highest recommended firing temperature $T_{F,max}$	°C	980
0,2-% Yield strength $R_{p0,2}$	MPa	450
Modulus of elasticity E	GPa	195
Tensile elongation at break A_5	%	4

Design

The design is carried out with suitable CAD software in consideration of dental rules. Avoid wall thicknesses less than 0,35 mm for the CAD-model. Increase the wall thickness at critical points. Wall thickness for anterior teeth: 0,4 mm, for posterior teeth: 0,6 mm, for prepared teeth: 0,6 mm. Connector cross-section in anterior region: 6 mm², in posterior region: 9 mm². Design the connectors as strong and high as possible (height: at least 3,5 mm, width: at least 2,5 mm).

Milling

All common HSC milling machines for dental applications can be used. Use suitable milling tools and cutting data according to the manufacturer's instructions for the dental milling machine. After milling **Realloy BC Softblank** must be inspected and needs to meet the following criteria, otherwise the milled work is not to be used to prepare dentures: There must be no material breakouts and no cracks must be visible.

Sintering of Realloy sintered metal blanks

Preparation for final sintering

Cut the milled frameworks out of the blank using a cross-toothed carbide cutter. For complex, wide-span work, consider supporting structures. After cutting it out of the blank, remove any grinding dust adhering to the framework with a suitable brush.

Important notice:

In the green compact state (not yet sintered), the framework must under no circumstances be evaporated or exposed to any other moist environment (e.g. ultrasonic bath). The sintering process can be carried out using different sintering techniques. Two techniques are possible here. For sintering, the milled crowns and frameworks can be placed in a SiC sintering bowl filled with yttrium oxide partially stabilized zirconium oxide (3Y-TZP) sinter beads. The diameter of the sinter beads should be 1.8 – 2.0 mm. Place the framework on the sinter balls with light pressure to ensure good support. Assemble the sintering bowl and sintering aids. Place the sintering bowl including sintering aids in the oven. In addition, depending on the milling technology, support pins can also be used to work on the milled component. The support pins ensure component stability during sintering and enable distortion-free sintering. In order to ensure a good surface on which the work can be placed, a ground zirconium oxide plate can also be used as a sample support.

Using zirconium oxide as a sintering aid ensures that no contact reactions can occur between the sintering crucible and the parts to be burned. It is important to ensure that there are no balls stuck in the interdental spaces or in the crown cavities!

Final sintering

Only use the high-temperature furnaces with inert gas connection recommended by Realloy e.K. for sintering. (see below also the operating instructions of the respective high-temperature furnace manufacturer).

The sintering furnaces from the following sintering furnace manufacturers can be used, but the sample preparation must be carried out as described under "Preparation for final sintering" and the sintering program must be stored accordingly. The following freely programmable metal sintering furnaces are suitable for final sintering:

- Mihm-Vogt GmbH (freely programmable)
- Thermo-Star GmbH (freely programmable)
- Nabertherm GmbH (freely programmable)
- Amann Gießbach AG

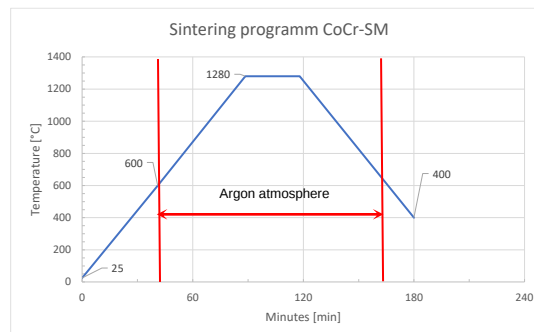
Sintering program:

Here is an example of the sintering program stored in the metal sintering furnace from Mihm-Vogt GmbH:

Program duration: 3 to 4 hours
3 hours are programmed with a delayed start.
cooling, the program ends after approx. 3.5 hours.

Sintering program: RT at 14 °C/min to 600 °C (switch on argon flooding)
at 14 °C/min to 1,280 °C (sintering temperature)
Holding time 30 min
at 14°C/min to 600°C (switch off argon flooding),
The oven opens at 500°C and cools down naturally.
Parts can be removed from 300°C.

Note: We recommend using a gas pressure of 1.2 to 1.4 mbar
Flooding of the sinter system to work. As a control should
on the sintering furnace a float flow meter (Kobold)
be installed. This serves to visually check the flow river.





Hersteller/Manufacturer: German Special Alloys GmbH | Carl-Friedrich-Benz-Str. 1b | 47877 Willich | Germany

C € 0044

Hergestellt für/ Produced for:

Realloy e.K. | Moerserstraße 232 | 47803 Krefeld | Germany | Fon: : +49 (0)2151-4864978 | Fax: +49 (0)2151-4864981 | Mail: info@realloy.net



Annotation:

Before using the sintering furnaces, we recommend contacting the respective furnace supplier and clarifying to what extent it is possible to transfer the sintering program specified by us in these furnaces while adhering to the sintering parameters and protective gas atmospheres described there. For some systems, the manufacturer also requires activation for entering sintering programs.

Note: Incorrect sintering results!

As a rule, the crown, bridges, frameworks are silver-colored. If the crown, bridges, framework, or certain areas show oxidation, then this is noticeably due to insufficient argon atmosphere, or residual oxygen. Depending on the severity of the reactions, the possible tarnish colors can range from slightly tarnished dull to grey, black, or even green with powdery decomposition products. In such cases, further use of the material should be avoided.

Ceramic firing

Use commercially available dental ceramics for cobalt-based metal alloys with a suitable linear thermal expansion coefficient. Please follow the associated work instructions and cooling schemes given by the ceramic manufacturer. After sintering:

1. Separation of connectors and finishing of the object. Carbide cutters are recommended.
2. Sandblasting the surface by use of a pencil-blaster with aluminium oxide 100 µm or 250 µm.
3. Ultrasonically clean the frame in distilled water or degrease with ethyl acetate.
4. The oxide firing is optional, to be done at about 960 °C under vacuum for 5 minutes. Always remove the oxide layer after oxide firing by sand blasting with aluminium oxide and degrease again.
Note: A clean surface is best to avoid bubbles in ceramics.
5. The opaque is applied on the surface by a first thin wash firing and a second evenly covering opaque layer.
Before firing always let the opaque dry for 5-10 minutes at 600 °C.
6. Firing and cooling should be carried out in accordance with the ceramic manufacturer's instructions.
7. After every firing step (dentine bake, build-up, and glazing) cooling phase until ca. 750 °C.

Finishing

After firing of the ceramic, polish the frame with suitable grinding and polishing instruments for dental alloys up to high gloss.

Soldering and Welding

Soldering before firing of the frame can be carried out with commercially available solders and high temperature flux. The width of the solder gap should be 0,05-0,2 mm. For welding with laser use suitable commercially available metal welding wires.

Safety Note

Metal dusts are harmful to health. Use a dust extractor. Consider allergic hypersensitivities to contents of the alloy. In case of suspected incompatibility with individual elements of this alloy, this should not be used.

Other Notes

All serious incidents related to the device shall be reported to the manufacturer and to the competent authority of the member state in which the user and/or the patient is established.

Warranty

These application recommendations are based on own experiments and experiences and can therefore only be regarded as guidelines. The dentist or dental technician is responsible for the correct processing of this alloy.



Batch number



Refer to instructions for use



Protect from direct sunlight



Not for reuse



Manufacturer